

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A waterproof recreational audio device for providing musical signals to a user, comprising:
 3. at least one transducer, such that said transducer enables music to be heard by said user via transcutaneous bone conduction;
 5. a means for said at least one transducer to be in vibratory contact with the head of said user; and
 7. means for waterproofing said at least one transducer.
1. 2. The waterproof recreational audio device according to claim 1, wherein said at least one transducer includes a plurality of transducers.
1. 3. The waterproof recreational audio device according to claim 2, wherein said plurality of transducers is arranged in an array.
1. 4. The waterproof recreational audio device according to claim 2, wherein the musical frequency range is split into three frequency channels.
1. 5. The waterproof recreational audio device according to claim 4, wherein said three frequency channels consist of:
 3. a low frequency range,
 4. a mid frequency range, and
 5. a high frequency range.

1 6. The waterproof recreational audio device according to claim 3,
2 wherein at least one of said transducers in said array is an ultrasonic
3 transducer.

1 7. The waterproof recreational audio device according to claim 3,
2 wherein at least one of said transducers in said array is a vibrotactile
3 transducer.

1 8. The waterproof recreational audio device of claim 1, wherein said
2 audio device includes at least one amplifier.

1 9. The waterproof recreational audio device according to claim 1,
2 wherein at least one of said transducers is positionable at the front of the
3 head of said user.

1 10. The waterproof recreational audio device according to claim 1,
2 wherein at least one of said transducers in said array is positionable at the
3 back of the head of said user.

1 11. The waterproof recreational audio device according to claim 1,
2 wherein said transducer is associated with a band that encircles the head of
3 a user.

1 12. The waterproof recreational audio device according to claim 1,
2 wherein said transducer is associated with a hat that is worn on the head of
3 said user.

1 13. The waterproof recreational audio device according to claim 1,
2 wherein said transducer is associated with a helmet that is worn on the
3 head of said user.

- 1 14. The waterproof recreational audio device according to claim 1,
2 wherein said transducer is associated with a band of recreational eye wear
3 selected from the group consisting of swim goggles, ski goggles, snorkel
4 mask, and sun glasses.

- 1 15. The waterproof recreational audio device according to claim 5,
2 wherein said low frequency range volume is adjustable.

- 1 16. The waterproof recreational audio device according to claim 5,
2 wherein said mid frequency range volume is adjustable.

- 1 17. The waterproof recreational audio device according to claim 5,
2 wherein said high frequency range volume is adjustable

- 1 18. The waterproof recreational audio device according to claim 1,
2 wherein said mid frequency range has a fixed maximum signal level of 90
3 dBa for 8 hours.

- 1 19. The waterproof recreational audio device of claim 1, wherein said
2 waterproof recreational audio device transmits a musical signal of a high
3 fidelity frequency response across a broad frequency range where there is:
4 a low frequency response is in the range of 40 - 1000 Hz
5 a mid frequency response is in the range of 250 - 6000 Hz, and
6 a high frequency response is in the range of 5000 - 20,000 Hz.

- 1 20. The waterproof recreational audio device of claim 19, wherein said
2 at least one transducer includes an ultrasonic transducer.

1 21. The waterproof recreational audio device of claim 19, wherein said
2 at least one transducer includes a vibrotactile transducer.

1 22. The waterproof recreational audio device of claim 19, wherein said
2 waterproof recreational audio device includes an adjusting capability for
3 the mid range frequency response, such that:

4 said mid frequency range volume can be adjusted to allow
5 environmental noise to be heard by the user,

6 said mid frequency range has a fixed maximum level to minimize
7 nuisance noise for individuals near said waterproof recreational audio
8 device, and

9 said mid range has a fixed maximum level to restrict harmful dB
10 noise levels for user.

1 23. The waterproof recreational audio device of claim 19, wherein a
2 volume of said low frequency range is adjustable.

1 24. The waterproof recreational audio device of claim 19, wherein a
2 volume of said mid frequency range is adjustable.

1 25. The waterproof recreational audio device of claim 19, wherein a
2 volume of said high frequency range is adjustable.

1 26. The waterproof recreational audio device of claim 19, wherein said
2 mid frequency range has a fixed maximum signal level of 90 dBa for 8
3 hours.

1 27. The waterproof recreational audio device of claim 1 further
2 comprising a sound source in communication with said at least one

3 transducer, said sound source generating a music signal which is received
4 by said at least one transducer.

1 28. The waterproof recreation audio device of claim 27 wherein said
2 communication between said sound source and said at least one transducer
3 is via a wired connection.

1 29. The waterproof recreation audio device of claim 27 wherein said
2 communication between said sound source and said at least one transducer
3 is via a wireless connection.

1 30. The waterproof recreation audio device of claim 27 wherein said
2 sound source is affixed to said means for said at least one transducer to be
3 in contact with the head of said user.

1 31. The waterproof recreation audio device of claim 27 wherein said
2 sound source is selected from the group consisting of MP3 player, tape
3 player, radio, audio transceiver, and disc player.

1 32. A recreational audio device, comprising:
2 at least one transducer which enables music to be heard by a user
3 via transcutaneous bone conduction; and
4 a support which supports said at least one transducer in contact
5 with a head of a user at a plurality of locations around the head of said
6 user.

1 33. The recreational audio device according to claim 32 wherein said at
2 least one transducer includes a plurality of transducers.

1 34. The recreational audio device according to claim 32 wherein said at
2 least one transducer can be removed from said support and re-positioned at
3 at least one different location on said support.

1 35. The recreational audio device according to claim 32 wherein said at
2 least one transducer can slide to different locations on said support.

1 36. The recreational audio device according to claim 32 wherein said
2 support can be oriented at multiple orientations relative to a head of a user.

1 37. The recreational audio device of claim 36 wherein said support is a
2 head band.

1 38. The recreational audio device of claim 32 further comprising
2 waterproofing for said at least one transducer.

1 39. The recreational audio device of claim 32 further comprising a sound
2 source for conveying musical signals to said at least one transducer.

1 40. A method for a user to listen to music via transcutaneous bone
2 conduction, comprising the steps of:
3 supplying musical signals from a source to at least one transducer
4 capable of transcutaneous bone conduction;
5 contacting a user's head with said at least one transducer; and
6 transmitting by transcutaneous bone conduction said musical signal
7 to the user.

1 41. The method recited in claim 40, further comprising a step of tuning
2 musical sound heard by a user.

